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In the Claims:

1. (Amended) Process for the operation of a laser device, wherein light pulses circulating in a resonator configuration, which consist of spectral components corresponding to multiple longitudinal modes of the resonator configuration, are produced and subject to a compensation of the group velocity dispersion, characterized in that a predetermined linear dispersion is introduced into the light path of the resonator configuration, so that at least one mode possesses a predetermined frequency and/or the mode separation between the modes possesses a predetermined value.

2. (Amended) Process according to claim 1, in which the linear dispersion is introduced into the resonator configuration through a spectrally specific effective change of the resonator length in a resonator branch, through which the light pulses traverse spectrally spatially separated after the compensation of the group velocity dispersion.

3. (Amended) Process according to Claim 2, in which the linear dispersion is introduced into the resonator configuration through the tilting of a plane resonator end mirror.

4. (Amended) Process according to Claim 1, in which the linear dispersion is introduced into the resonator configuration through the tilting of a transparent plane, a pushing in of a pair of prisms in the light path of the resonator configuration, a setting of the effective pumping power for the pumping of the active medium of the laser device, or a change of the geometric configuration of the laser device relative to a pump laser.

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5. (Amended) Process according to one of the Claims 1, 2 or 4, in which the linear dispersion is introduced into the resonator configuration within the framework of a mode control loop

dependent upon the frequency deviation of at least one first reference mode of the light pulses from a reference frequency, which is:

- the output frequency of an optical reference frequency generator,
- a higher harmonic or an even number fraction of the output frequency or of the higher harmonic,
- a frequency multiple of a lower frequency reference mode of the light pulses, or a fractional frequency of a higher frequency reference mode of the light pulses.

6. (Amended) Process according to Claim 5, whereby in the mode control loop light pulses of the laser device and light with the reference frequency are superposed and directed to a photosensitive element, whose electrical output signal shows a modulation at a beat frequency corresponding to the distance of the frequency of the first reference mode from the reference frequency, whereby a control is provided, which sets the linear dispersion of the resonator configuration so that the beat signal is minimal or possesses a predetermined beat frequency.

7. (Amended) Process according to Claim 5, whereby the optical reference frequency generator is stabilized in a reference laser control loop in relation to a second higher frequency reference mode of the light pulses.

8. (Amended) Process according Claim 5, whereby the optical reference frequency generator is a stabilized continuous wave laser.

9. (Amended) Process according to one of the Claims 1, 2 or 4, whereby the linear dispersion is introduced into the resonator configuration within the framework of a mode control loop depending upon the deviation of the multiplied frequency of a first reference laser, which is phase coupled with a first lower frequency reference mode of the light pulses, from the frequency

of a second reference laser, which is phase coupled in a reference laser control loop with a second higher frequency reference mode of the light pulses.

10. (Amended) Process according to Claim 9, whereby the second reference laser is phase coupled with the second higher frequency reference mode of the light pulses through a scaling stage.

11. (Amended) Process according to one of Claims 1, 2 or 4, whereby the resonator length of the laser device is regulated within the framework of a repetition frequency control loop, in which the repetition frequency of the light pulses is superposed with a radio frequency derived from a radio frequency generator reference, whereby a control is provided for, which sets the resonator length of the laser device so that the oscillating signal formed by the superposition is minimal or possesses a predetermined beat frequency.

12. (Amended) Process according to one of the Claims 1, 2 or 4, whereby the linear dispersion is introduced into the resonator configuration within the framework of a repetition frequency control loop, in which the repetition frequency of the light pulses is superposed with a radio frequency derived from a radio frequency reference generator, whereby a control is provided for, which sets the resonator length of the laser device so that the oscillating signal formed by the superposition is minimal or possesses a predetermined beat frequency.

13. (Amended) Process according to Claim 12, whereby the resonator length of the laser device is regulated within the framework of a mode control loop dependent upon the frequency deviation of at least a first reference mode of the light pulses from a reference frequency, which is the output frequency of an optical reference frequency generator or a higher harmonic or an even number fraction of the output frequency or the higher harmonic.

14. (Amended) Process for the operation of a reference laser at a stabilized optical frequency, whereby the output frequency of the reference laser or a higher harmonic or an even number fraction of the output frequency or of the higher harmonic is phase coupled with a second reference mode of light pulses, which are produced with a laser device according to a process of one of the claims 1, 2, or 4, whereby the second reference mode has a frequency different from the first reference mode.

15. (Amended) Process for the measurement of the output frequency of a reference laser, whereby a reference mode of light pulses, which are produced with a laser device according to a process of one of the claims 1, 2 or 4, is phase coupled with the output frequency of the reference laser or a higher harmonic or an even number fractional of the output frequency or the higher harmonic and the output frequency is determined from the regulating parameters of the laser device.

16. (Amended) Laser device for the production of short light pulses, having a resonator configuration with

- an active medium,
- a plurality of resonator mirrors with an incoupling mirror for the coupling in of pump light to the active medium, an outcoupling mirror for the output of light pulses and several tilted mirrors, and
- a compensating mechanism for the compensation of the group velocity dispersion of the light pulses, wherein the resonator configuration includes a dispersion setting device for the introduction of a linear dispersion into the light path of the resonator configuration.

17. (Amended) Laser device according to Claim 16, whereby the dispersion setting device is located in a branch of the resonator on the side of the compensating mechanism facing away from the active medium.

18. (Amended) Laser device according to Claim 17, whereby the dispersion setting device is a pivoting mechanism on an tilted mirror functioning as a resonator end mirror.

19. (Amended) Laser device according to Claim 16, whereby the dispersion setting device comprises a transparent plate with a tilting mechanism, a pair of prisms with a sliding mechanism, which are included in the resonator configuration, an apparatus for the variation of the effective pump power of the pump laser, or an apparatus for the variation of the geometrical configuration of the laser device relative to a pump laser.

20. (Unchanged) Laser device according to Claim 16, which is constructed as a ring laser.

21. (Amended) Laser device according to Claim 16, whereby a resonator length setting device is provided for the change of the resonator length through a change in positioning of one of the tilted mirrors.

22. (Amended) Laser device according to Claim 16, whereby a mode control loop is provided for the regulation of the dispersion setting device or the regulation of the resonator length setting device, dependent upon the frequency deviation of at least one frequency component of the light pulses from a reference frequency, which is the output frequency of an optical reference frequency generator or a higher harmonic or an even number fraction of the output frequency or of the higher harmonic or a multiplied frequency of a lower frequency reference mode or a divided frequency of a higher frequency reference mode of the light pulses.

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23. (Amended) Laser device according to Claim 22, whereby the mode control loop includes an apparatus for the production of a beat signal from the frequency component of the light pulses and the reference frequency and a mode control for the dispersion setting device or the resonator length setting device, so that the dispersion setting device or the resonator length setting device is activated in such a way that the beat signal is either minimal or possesses a predetermined beat frequency.

24. (Amended) Laser device according to one of the Claims 22 or 23, whereby a reference laser and possibly multiplier or divider stages are provided for the generation of the reference frequency and the device for the production of the beat signal includes a photosensitive element.

25. (Amended) Laser device according to Claim 24, whereby a filter element for spectral selective detection of the light pulses is provided at the photosensitive element.

26. (Amended) Laser device according to one of the Claim 16, whereby a mode control loop is provided for the regulation of the dispersion setting device or the regulation of the resonator length setting device, dependent upon the frequency deviation of the frequency of a first reference laser, which is phase coupled with a first lower frequency reference mode of the light pulses, from the frequency of a second reference laser, which is phase coupled with a second higher frequency reference mode of the light pulses.

27. (Amended) Laser device according to Claim 16, whereby a repetition frequency control loop is provided for the regulation of the resonator length setting device or the dispersion setting device, dependent upon the frequency deviation of at least one differential frequency between the repetition frequency of the light pulses and a radio frequency.

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28. (Amended) Laser device according to Claim 27, whereby a radio frequency reference generator is provided for the generation of the reference radio frequency and the repetition frequency control loop comprises a device for the generation of a beat signal from the signal of a photosensitive element that captures the light pulses, and from the signal of a radio frequency reference generator, and a reference frequency control for the resonator length setting device or the dispersion setting device, whereby the repetition frequency control is structured so that the resonator length setting device or the dispersion setting device is operated so that the second oscillating signal is minimal or possesses a predetermined beat frequency.

29. (Amended) Laser device according to Claims 21, 22, 26 or 27, whereby further a reference laser control loop is provided for the regulation of the optical reference frequency generator or reference laser, with a device for the generation of a beat signal from a higher frequency component of the light pulses or a part of this frequency component and a frequency equal to a multiple of the reference frequency, and a setting device for the setting of the optical reference frequency generator or reference laser so that the beat signal is minimal or has a predetermined beat frequency.

30. (Amended) Laser device according to Claim 16, whereby the active medium includes a solid or a dye medium.

31. (Amended) Laser device according to Claim 16, whereby a device is provided for self phase modulation.

32. (Amended) Method of using a laser device according to Claim16 for the measurement of optical frequencies of frequency differential, generation of optical frequencies, bridging of large